

# MONTHLY WEATHER REVIEW.

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## INTRODUCTION.

The MONTHLY WEATHER REVIEW for November, 1902, is based on reports from about 3,100 stations furnished by employees and voluntary observers, classified as follows: Regular stations of the Weather Bureau, 160; West Indian service stations, 17; special river stations, 132; special rainfall stations, 48; voluntary observers of the Weather Bureau, 2,562; Army post hospital reports, 18; United States Life-Saving Service, 9; Southern Pacific Company, 96; Hawaiian Government Survey, 75; Canadian Meteorological Service, 33; Jamaica Weather Service, 130; Mexican Telegraph Service, 20; Mexican voluntary stations, 7; Mexican Telegraph Company, 3; Costa Rican Service, 7. International simultaneous observations are received from a few stations and used, together with trustworthy newspaper extracts and special reports.

Special acknowledgment is made of the hearty cooperation of Prof. R. F. Stupart, Director of the Meteorological Service of the Dominion of Canada; Mr. Curtis J. Lyons, Meteorologist to the Hawaiian Government Survey, Honolulu; Señor Manuel E. Pastrana, Director of the Central Meteorological and Magnetic Observatory of Mexico; Camilo A. Gonzales, Director-General of Mexican Telegraphs; Capt. S. I. Kimball, Superintendent of the United States Life-Saving Service; Lieut. Commander W. H. H. Southerland, Hydrographer, United States Navy; H. Pittier, Director of the Physico-Geographic Institute, San Jose, Costa Rica; Capt. François S. Chaves, Director of

the Meteorological Observatory, Ponta Delgada, St. Michaels, Azores; W. M. Shaw, Esq., Secretary, Meteorological Office, London; and Rev. Josef Algué, S. J., Director, Philippine Weather Service; and H. H. Cousins, Chemist, in charge of the Jamaica Weather Office.

Attention is called to the fact that the clocks and self-registers at regular Weather Bureau stations are all set to seventy-fifth meridian or eastern standard time, which is exactly five hours behind Greenwich time; as far as practicable, only this standard of time is used in the text of the Review, since all Weather Bureau observations are required to be taken and recorded by it. The standards used by the public in the United States and Canada and by the voluntary observers are believed to conform generally to the modern international system of standard meridians, one hour apart, beginning with Greenwich. The Hawaiian standard meridian is  $157^{\circ} 30'$ , or  $10^{\circ} 30'$  west of Greenwich. The Costa Rican standard of time is that of San Jose,  $0^{\circ} 36' 13''$  slower than seventy-fifth meridian time, corresponding to  $5^{\circ} 36'$  west of Greenwich. Records of miscellaneous phenomena that are reported occasionally in other standards of time by voluntary observers or newspaper correspondents are sometimes corrected to agree with the eastern standard; otherwise, the local standard is mentioned.

Barometric pressures, whether "station pressures" or "sea-level pressures," are now reduced to standard gravity, so that they express pressure in a standard system of absolute measures.

## FORECASTS AND WARNINGS.

By Prof. E. B. GARRIOTT, in charge of Forecast Division.

Unusually stormy weather prevailed over the North Atlantic Ocean during November, 1902. On the British coast gales prevailed from the 5th to the 12th and during the last decade of the month. Three storms of marked strength moved eastward over Newfoundland from the 23d to the 28th. The gales that began on the west coast of the British Isles on the 5th attended the passage of a storm that appeared over the Caribbean Sea on the morning of October 31. This storm passed northeastward over Santo Domingo during November 1, and advanced thence northeastward over the Atlantic with a gradual increase in intensity. On October 31 the following message was telegraphed West Indian Weather Bureau stations from San Juan, Porto Rico, to Havana, Cuba, and to coast Weather Bureau stations from New Orleans, La., to Boston, Mass.:

Evidence of a disturbance south of eastern Cuba which may develop strength and move northward. Not considered safe for vessels to leave Cuban ports or to sail for Cuban waters during the next twenty-four hours.

On November 1, the same disposition was made of the following message:

Center of disturbance moving northeastward over Santo Domingo. No indication of hurricane in the West Indies, but strong north to northeast winds will prevail over the ocean north of the West Indies and off the United States coast.

The observatory at Horta, Fayal, Azores, was cabled as follows:

Disturbance moving northeastward from the West Indies. Unsettled, stormy weather indicated over middle and western Atlantic next few days.

The following message was cabled to Lloyds, London:

Westward bound vessels will experience strong north to northeast winds, and possibly severe gales.

The storm referred to apparently moved northeastward over the Atlantic Ocean, and its approach to European waters was indicated on the morning of the 5th by reports from the British Isles.

On the 23d, Lloyds, London, was cabled as follows:

Storm of marked strength moving eastward over Newfoundland will probably be met by westward bound steamers.

This information was also telegraphed to Boston, New York, and Philadelphia for the information of transatlantic shipping interests. Exceptionally severe gales were encountered by transatlantic steamers during the closing days of November.

The storms of the month were not of marked severity on the immediate coasts and Great Lakes of the United States. From the 7th to the 10th a disturbance moved northeastward from off the Florida coast to Newfoundland, which developed considerable strength when off Hatteras. A squadron of United States warships that sailed from Fort Monroe, Va., November 5 for Culebra Island, West Indies, encountered a gale southeast of Cape Hatteras, during which two coal barges were lost. On the 25th and 26th a storm that had advanced

from the Rio Grande Valley caused gales along the middle Atlantic and New England coasts.

Three disturbances that first appeared over the west part of the Gulf of Mexico moved northeastward to the Great Lakes, and one of these was the storm before referred to as having moved eastward over Newfoundland on the 23d.

Several vessels were lost on the Great Lakes during the third decade of the month. On the night of the 23d the steamer *Sylvanus J. Macy* sprung a leak off Point Burwell, Ontario, and sank. On the 25th the steamer *Quito* ran ashore in a northeast gale, while trying to make the harbor at Lorain, Ohio. During the night of the 29th the steamer *Charles Hebard* was wrecked at Point Mamainse, Lake Superior.

A number of barometric depressions appeared on the north Pacific coast, notable among which were those of the 8-10th, and 16-18th. The storm of the 16-17th was particularly severe, and a number of expressions of appreciation have been received regarding the value to shipping interests of the warnings issued in connection therewith.

Ample warnings were issued of all storms that visited the Atlantic, Pacific, and Gulf coasts and the Lake region.

The first important cold wave of the season swept southward and eastward from the British Northwest Territory over the interior of the country from the 26th to the 28th, carrying the line of freezing temperature almost to the coast line of the Gulf of Mexico. Timely warning was given to all interests that were subject to damage or loss by frost and cold. The following comment is made by the New Orleans press on the warnings issued for the Gulf district, the only section east of the Pacific coast States in which agricultural products were endangered by frost:

The Times-Democrat of November 28, 1902:

The warnings sent out by Dr. Cline Wednesday morning were timely for all parts of this extensive district. Freezing weather occurred over Arkansas, Oklahoma, and northwest Texas. Heavy frosts occurred over the interior of Texas, and frost occurred generally over southern Texas and all of Louisiana. Frost was in evidence in New Orleans, and on the outskirts was quite heavy. The warnings of these severe conditions were issued by the Weather Bureau well in advance, and all business interests were prepared for the frosts and freezing.

The Daily Picayune of November 29, 1902:

This season's special forecasts were inaugurated Wednesday by the forwarding of frost warnings to every station in the west Gulf district, with the result that planters and farmers, relying implicitly upon Dr. Cline's forecasts, which were so accurate in past seasons, had time to protect their crops from the low temperatures. This warning, in ample time, was a thanksgiving offering to southern industrial and agricultural interests, and its value can hardly be estimated in cold cash.

From the 25th to the 30th frost was general in California. The frosts of this period, and also the rains of the month were covered by forecasts and special warnings issued from San Francisco.

During the third decade of the month heavy rains caused destructive freshets in eastern Texas, and large areas of bottom lands along the Red River above Shreveport were inundated. The floods in the Red River continued into December, and will be referred to in the MONTHLY WEATHER REVIEW for that month.

#### BOSTON FORECAST DISTRICT.

The weather was remarkable for unusual mildness and light precipitation. The storms of the 8-9th and 25-26th were of marked severity, with heavy easterly gales. The latter storm was the most severe of the season. All warnings were timely, and called forth most favorable comment.—*J. W. Smith, Forecast Official.*

#### NEW ORLEANS FORECAST DISTRICT.

Warnings for cooler, brisk to high northerly winds over eastern Mexico, and northwest storm warnings for the west

Gulf coast were issued on the 26th, and cold, high winds followed. Warnings were issued on the 26th for freezing weather in northern part of the district and frost to the coast line, and the first general frost (killing throughout the interior) occurred on the morning of the 27th. Press comments regarding the warnings have been forwarded.—*I. M. Cline, Forecast Official.*

#### CHICAGO FORECAST DISTRICT.

Storm warnings were displayed on the upper Lakes at frequent intervals during the month, and evidently vessel masters took necessary precautions. No very severe storms occurred, but there were some casualties. The Canadian steamer *Bannockburn* left Port Arthur, Ont., on November 21, and no trace of her has yet been found. She undoubtedly foundered in one of the storms that followed soon after sailing. It is probable, however, that at no time the steamer came within range of the storm warning stations of this service. The other important casualties were the loss of the steamer *Hebard*, and one of her consorts, on Lake Superior the night of the 29th. During the storm the steamer had parted from her consorts, and in the high wind and snow the captain lost his bearings and found himself on the breakers near Point Mamainse. The crew were rescued the next day, but the boat went to pieces on the rocks. The *Hebard* was a wooden steamer and her business of towing barges during the stormy season was extremely hazardous. It would seem that the captain of such craft should pay particular attention to the daily forecasts and storm warnings. All vesselmen that could be reached were fully advised as to the approach of the storm in which these boats were wrecked.—*H. J. Cor, Professor.*

#### DENVER FORECAST DISTRICT.

Unsettled weather characterized November, but cold waves were notably few, unimportant, and local in character. A feature of the month was the heavy precipitation that occurred in Arizona, especially in connection with the low area, central in Wyoming on the morning of the 19th, which took a south-westward course to Arizona where it remained for several days. The snowfall was very heavy in northern Arizona.—*F. H. Brandenburg, Forecast Official.*

#### SAN FRANCISCO FORECAST DISTRICT.

Unusually heavy rainfalls occurred in the northern portion of California on November 8 and 9. At Eureka the 24-hour rainfall was 3.16 inches, and at Red Bluff, 2.26 inches. At the latter point the rainfall in forty-eight hours amounted to 4.46 inches. The forecasts of rain throughout California were handsomely verified, and wherever fruit was injured the loss was due to causes beyond the control of the orchardists. Ample warning was given at nearly all points. A second stormy period began November 13, but did not cause unusual weather conditions south of San Francisco. Southwest storm warnings were ordered from San Francisco to Eureka at noon November 18, and a few hours later the warnings were extended southward to Santa Barbara, and advisory messages were sent to Los Angeles and San Diego. By the evening of the 19th rain had fallen as far south as San Diego. A peculiar feature of the disturbance was the excessive rainfall in southeastern California, the valley of the Colorado, and Arizona. In the latter territory rain or snow fell several days, the snowfall in the northern portion being unusually heavy. Light to heavy frosts occurred generally in California on November 25, and subsequent mornings.—*A. G. McAdie, Professor.*

#### PORTLAND, OREG., FORECAST DISTRICT.

Although wet and stormy the month was not unseasonably